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MICHAEL S. KAPPES

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SEED INTELLECTUAL PROPERTY LAW GROUP PLLC  
701 FIFTH AVE  
SUITE 6300  
SEATTLE, WA 98104-7092

EXAMINER

NGUYEN, TOAN D

ART UNIT

PAPER NUMBER

2665

DATE MAILED: 02/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/164,504

Applicant(s)

KAPPES, MICHAEL S.

Examiner

Toan D Nguyen

Art Unit

2665

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 6-8, 11-13 and 16-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Betts et al. (US 5,812,537).

For claims 1 and 6, Betts et al. disclose echo canceling method and apparatus for data over cellular comprising:

generating an analog output signal by said first transmitter for receipt by said second receiver, the analog output signal including characteristics associated with a nonlinearity introduced by said first transmitter (figure 3, col. 4 line 65 to col. 5 line 8);

sampling said analog output signal (col. 5 lines 5-8); and

performing echo cancellation based on said analog output signal that includes the characteristics associated with the nonlinearity, using an echo canceler having a transfer function that is based upon a transfer function of a line coupling between the first transmitter and a second receiver, wherein said echo cancellation cancels the echo signals conveyed by said echo channel (col. 5 lines 24-25).

For claims 7 and 8, Betts et al. disclose echo canceling method and apparatus for data over cellular comprising:

sampling an analog output signal provided by a local transmitter (col. 5 lines 5-8),  
said analog output signal including characteristics associated with a nonlinearity  
introduced by said local transmitter (col. 4 lines 20-24);

converting said analog output signal into a corresponding digital signal (col. 5  
lines 5-8); and

producing a compensated digital signal for receipt by a local receiver, wherein  
said nonlinearity is substantially eliminated from the compensated digital signal, by  
using an echo canceler that receives the sampled analog output signal that includes  
characteristics associated with the nonlinearity, the echo canceler having a transfer  
function that is based upon a transfer function of a line coupling present in the digital  
communication system (col. 4 lines 20-31 and col. 5 lines 24-25).

For claims 11-13 and 16, Betts et al. disclose echo canceling method and  
apparatus for data over cellular comprising:

a transmitter for providing an analog output signal having characteristic  
associated with a nonlinearity introduced by the transmitter (figure 3, col. 4 line 65 to  
col. 5 line 4);

a receiver for receiving a compensated digital signal (figure 3, col. 4 line 65 to  
col. 5 line 4); and

an echo canceler having an input signal and an output signal, wherein said input  
signal is essentially the analog output signal provided by the transmitter and having the  
characteristics associated with the nonlinearity, and said output signal is representative  
of the echo signals and the non-linearities present in said digital communication system,

the echo canceler having a transfer function that is based upon a transfer function of a line coupling present in the digital communication system (col. 4 lines 20-31 and col. 5 lines 24-25); and

means for producing said compensated digital signal in response to the output signal of said echo canceler and a signal sent by a second communication device associated with said digital communication system (col. 4 lines 20-31 and col. 5 lines 24-25).

For claim 17, Betts et al. disclose echo canceling method and apparatus for data over cellular comprising:

generating an analog output signal by said first transmitter for receipt by said second receiver, the analog output signal including characteristics associated with a nonlinearity introduced by the first transmitter (figure 3, col. 4 line 65 to col. 5 line 8);

sampling said analog output signal (col. 5 lines 5-8);

detecting a signal on an echo channel associated with an actual echo signal at said second device (col. 5 lines 24-42); and

performing echo cancellation based on said sampled analog output signal having the characteristics associated with the nonlinearity and said signal on said echo channel, by using an echo canceler having a transfer function that is based upon a transfer function of a line coupling between the first transmitter and a second receiver (col. 5 lines 24-25).

For claim 18, Betts et al. disclose echo canceling method and apparatus for data over cellular comprising:

sampling an analog output provided by a local transmitter (col. 5 lines 5-8), said analog output including a known training signal and characteristics associated with a nonlinearity introduced by said local transmitter (col. 4 lines 20-24);

calculating an estimated echo signal in response to said known training signal (figure 2, col. 3 lines 21-49 and col. 5 lines 29-38);

detecting a signal on an echo channel associated with an actual echo signal at a second device (col. 5 lines 24-42); and

producing a compensated digital signal for receipt by a local receiver, wherein said nonlinearity is substantially eliminated from the compensated digital signal on the basis of the estimated echo signal and said signal associated with said actual echo signal at said second device, by using an echo canceler that receives the sampled analog output that includes the characteristics associated with the nonlinearity, the echo canceler having a transfer function that is based upon a transfer function of a line coupling between the first transmitter and a second receiver (col. 5 lines 22-42).

For claims 19-22, Betts et al. disclose echo canceling method and apparatus for data over cellular comprising:

a transmitter for providing an analog output signal having characteristics associated with a linearity introduced by the transmitter (figure 3, col. 4 line 65 to col. 5 line 4);

a receiver for receiving a compensated digital signal (figure 3, col. 4 line 65 to col. 5 line 4);

an echo canceler coupled to an output terminal of the transmitter having an input signal and an output signal, wherein said input signal is essentially the analog output signal provided by the transmitter and having the characteristics associated with the nonlinearity, and said output signal is representative of the echo signals and the non-linearities present in said digital communication system, the echo canceler having a transfer function that is based upon a transfer function of a line coupling present in the digital communication system (col. 4 lines 20-31 and col. 5 lines 24-25);

an input associated, at least in part, with an actual echo signal at a second communication device (col. 5 lines 24-42); and

a summing junction operably coupled with the output signal of the echo canceller and further operably coupled with the input associated, at least in part, with said actual echo signal at said second communication device (figure 3, col. 5 lines 36-42).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2-5, 9-10 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Betts et al. (US 5,812,537) in view of Agazzi et al. (US 4,669,116).

For claims 2-5, 9-10 and 14-15, Betts et al. do not disclose wherein said performing echo cancellation substantially reduces the effect, on signals received by said first receiver, of nonlinearities present in said first transmitter. In an analogous art,

Agazzi et al. disclose wherein said performing echo cancellation substantially reduces the effect, on signals received by said first receiver, of non-linearities present in said first transmitter (col. 12 lines 52-59).

Agazzi et al. disclose further wherein said performing echo cancellation further comprises: converting said analog output signal into a corresponding digital signal, said digital signal corresponding to at least a part of the echo signals as well as the non-linearities present in said first transmitter (col. 4 lines 2-5); and subtracting the digital signal from signals received by said first device to produce a compensated digital signal (col. 3 line 68 to col. 4 line 2 as set forth in claim 3), wherein said performing echo cancellation further comprises training an echo canceler to account for at least a part of the echo signals imparted by said echo channel on signals received by said first receiver section 3.2, col. 11 line 13 to col. 12 line 59 as set forth in claim 4-5, 9-10 and 14-15).

One skilled in the art would have recognized performing echo cancellation substantially reduces the effect, on signals received by said first receiver, of non-linearities present in said first transmitter to use the teachings of Agazzi et al. in the system of Betts et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use the echo cancellation technique as taught by Agazzi et al. in Betts et al.'s with the motivation being to provide a linear canceller algorithm that can still be used in the face of a nonlinear channel and nonlinear canceller implementation (col. 12 lines 60-62).

***Response to Arguments***



5. Applicant's arguments filed October 26, 2004 have been fully considered but they are not persuasive.

The applicant argues with respect to claims 1, 7, 11, 17, 18 and 19, that Betts et al disclose figure 3 is similar to figure 2 (prior art) of the present application, in that the echo canceller is coupled to an input terminal of the transmitter so that both the transmitter and echo canceller receive substantially the same input, which therefore, does not have linearities introduced by the transmitter. The examiner disagrees. Applicant's attention is directed to Betts patent at col. 4 line 66 to col. 5 line 8 (figure 3), where Betts clearly teaches in figure 3 which is similar to figure 3 of the present application, "an analog line signal,  $f_s(t)$ , transmitted from far-end modem, e.g., PSTN modem 300, is received and is directed to bandpass filter (BPF) 620. This signal is referred to as the "far-end data signal," and utilizes the same frequency band as the transmitted signals,  $n_s(t)$ , i.e., cellular modem 100 is a full-duplex modem. Bandpass filter 620 removes energy outside the signal passband from the far-end data signal 612 to form signal 621, which is then converted to digital form by analog-to-digital (A/D) converter 625 to form received signal  $r_s(t)$ ."

Betts discloses further at col. 5 lines 24-25 "To this end, far-end echo canceller 650 processes received signal  $r_s(t)$ ." Therefore, the echo canceller of Betts is based on an output analog signal that is generated by the transmitter and which includes characteristics that are associated with nonlinearities introduced by the transmitter.

***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toan D Nguyen whose telephone number is 571-272-3153. The examiner can normally be reached on M-F (7:00AM-4:30PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Huy Vu can be reached on 571-272-3155. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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MAN U. PHAN  
PRIMARY EXAMINER